Agricultural Extension Service ● University of Minnesota

FACT SHEET

DAIRY HUSBANDRY NO. 14—1975

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Feed Inventory

Dairymen must run their farms as businesses. A simple dairy feed inventory can help you make decisions and help you plan current and future feeding programs. Delivering a nutritional, balanced ration yearround will maintain top milk production. By completing a feed inventory, you can:

- adjust your feeding program early in the season, before you run short;
- decide if you have enough feed;
- ensile more corn silage to meet forage needs or shortages;
- accurately balance rations for milk cows, dry cows, and heifers;
- sell excess feeds (forage or grain);
- plan future cropping programs.

Using the inventory form

A simple feed inventory form is on the back of this fact sheet. Enter your cattle inventory, feed needs, and feed resources there. Then you can quickly evaluate your situation. Several tables are included to convert silo capacities to tons of feed for various forages and grains. A sample is filled out to guide you.

Part 1 (cattle inventory) converts cattle on the farm to animal units (cow equivalents). One cow, two yearlings, or four calves equal one animal unit of feed needed. This keeps calculations simple. If you want to refine the form, enter the level of each feed (forage and grain) fed to each group of cattle (calves, yearling heifers, and cows).

Part II (feed needs) calculates the amount of feed needed based on amount fed per day, number of days of feeding, and number of animal units. Your DHI records can provide this information.

Part III (feed resources) summarizes the amount of feed available. Convert all feed to a ton basis. The conversion tables and bushel weights speed up calculation.

Part IV (summary) is a balance sheet to determine which feeds are in excess or in insufficient amounts.

The sample

John Dairyman has 40 milk cows, 20 yearlings (1 to 2 years of age), and 20 calves (less than 1 year). He feeds 20 pounds of hay, 20 pounds of corn silage, and 10 pounds of grain per cow per day. John fills out the form Nov. 1. He needs a 200-day supply of hay (until June), a 300-day supply of corn silage, and a 270-day inventory of grain (until oats harvest). Feed on hand as of Nov. 1 was 3,000 bales of first crop (50-pound bale), 1,000 bales of second crop (40-pound bales), 40

Table 1. Estimated corn silage (early dent stage) capacity in tower silos.*

Depth of settled silage	Silo diameter (feet)											Av. wt. per cu. ft.
(feet)	12	14	16	18	20	22	24	26	28	30	36	(pounds)
	(tons)											
20	39	54	70	89	110	133	158	186	216	248	356	34.9
22	45	67	80	101	126	152	181	215	247	283	404	36.3
24	51	70	91	113	142	172	204	240	278	320	452	37.7
26	57	78	101	128	159	192	228	269	312	358	512	39.0
28	64	86	115	146	177	214	254	300	347	398	584	40.2
30	70	96	125	158	195	236	280	330	382	440	632	41.4
32	77	106	135	172	215	260	309	364	422	483	688	42.6
34	84	114	150	190	234	284	336	396	458	527	742	43.8
36	92	124	161	205	254	308	365	430	499	572	820	45.0
38	99	135	176	222	274	332	394	463	537	617	888	46.0
40	106	145	189	239	295	358	423	500	578	663	956	47.0
42	114	155	203	255	317	384	455	537	620	713	1020	48.0
44	122	166	217	274	339	410	487	573	665	763	1096	49.0
46	130	177	230	292	361	437	518	610	706	813	1168	50.0
48	139	187	246	311	384	465	552	650	753	865	1244	51.0
50	147	200	261	330	407	492	583	688	795	913	1320	52.0
52	155	212	277	350	431	522	620	730	845	970	1400	52.8
54	163	224	293	370	455	550	655	770	890	1020	1480	53.6
56	171	236	309	390	480	580	690	810	940	1080	1560	54.4
60	188	260	341	430	529	640	760	910	1030	1190	1720	56.0
65	–	–	391	483	593	716	855	1017	1161	1339	1934	57.6
70	–	–	416	539	660	790	939	1139	1279	1468	2148	59.2
75	–	–	–	–	716	867	1040	1230	1423	1637	2162	60.8
80	–	–	–	–	784	948	1129	1378	1538	1758	2356	62.4
85	–	–	–	–	–	–	–	1443	1685	1935	2790	64.0
90	–	–	–	–	–	–	–	1567	1816	2084	3004	65.6

*Capacities are estimated for corn in dough or early dent stage.

feet of corn silage in a 50- by 16-foot silo, 500 bushels of oats, 1,000 bushels of ear corn, and 1,000 bushels of shelled corn.

Your job

After reviewing the sample inventory worksheet, complete the form for your dairy herd. Use the correction factors in table 2 if your silage is hay crop silage. Also, if your silo was filled, but is now only half full, the bottom half will contain more feed than the top half. By using table 1, you can accurately predict the amount of silage remaining in the silo.

Example:

20 ft x 60 ft (settled) of corn silage = 529 tons (when full)
30 ft remain (subtract 20 ft x 30 ft)= 195 tons (top half)

Remaining silage (30 ft) = 334 tons (bottom half)

If you used the table value of 20 feet by 30 feet of corn silage, you would have predicted 195 tons of silage remaining instead of 334 tons because of the great compaction in the bottom of the silo.

Conclusions and strategies

Now that we have evaluated John Dairyman's needs and resources, we can make some suggestions:

1. Using the current feeding program, John will be short of hay, but has an excess of 24 tons of corn silage. By substituting 3 pounds of corn silage for 1 pound of hay, the hay deficit is 7 tons.
2. Increasing corn silage (higher in energy than hay) to the milk cows can reduce the amount of grain (ear corn and oats) needed.
3. Additional protein will be needed if corn silage is increased. Protein supplement will increase the grain supply. No additional cereal grain may be needed. Look for a good protein buy.
4. Is grain needed for the yearling heifers? Reformulate this ration. This could save you tons of grain. Investigate a source of urea to complement the corn silage forage program.
5. Selective culling of some livestock is another possibility.

You can do this exercise for your farm. It can really help.

Table 2. Correction factors for estimating hay crop silage capacity in tower silos (in table 1).

Percentage dry matter	Multiply appropriate figure in table 1 by:
25	1.10
30 - 35	1.00
40	.90
50	.75

Table 3. Silage capacity of horizontal silos.*

Average silo width (ft.)	Tons per foot of silo length: Depth 6 ft.	Depth 8 ft.	Depth 10 ft.
8	0.96	1.28	1.60
12	1.44	1.92	2.40
16	1.92	2.56	3.20
20	2.40	3.20	4.00
24	2.88	3.84	4.80
32	3.84	5.12	6.40

*Based on packed silage density of 40 lb/cu. ft.

Table 4. Capacities of tower silos.

	High-moisture ground ear corn or high-moisture whole shelled corn						
Settled depth	Inside diameter in feet: 10	12	14	16	18	20	22
Feet	Tons						
20	37						
25	47	68					
30	56	81	111	144	183	226	272
35	65	95	129	168	213	264	318
40	75	108	147	192	243	302	363
45	84	122	166	216	274	339	409
50		135	184	240	304	377	454
55			203	264	335	415	499
60				288	365	452	545

FEED INVENTORY WORKSHEET (SAMPLE)

I. Cattle inventory

Number of milk cows: 40 Number of calves divided by 4: 5

Number of yearlings divided by 2: 10 Total number of animal units: 55

II. Feed needs

	Lb/day	x Days	Lbs/ Animal unit	Tons/ Animal unit	x Animal unit	= Tons needed
Hay	20	200	4,000	2	55	110
Hay silage						
Silage	20	300	6,000	3	55	165
Grain	10	270	2,700	1.35	55	74

III. Feed resources

A. Forage

	Bales	x Lb/bale	= Lbs	Tons (lbs÷ 2,000)
Hay (1st crop)	3,000	50	150,000	75
Hay (2nd crop)	1,000	40	40,000	20

	Silo size	Depth settled silage	= Tons	Correction factor	Tons
Silage (corn)	50x16	40ft	189	None	189
Silage					
Silage					

B. Grain

	Bushels	x Lb/bu.	= Lbs	Tons (lbs÷ 2,000)
Oats	500	32	16,000	8
Ear corn	1,000	70	70,000	35
Shelled corn	1,000	56	56,000	28
Barley		48		

Summary	Hay	Silage	Silage	Grain	Grain
Amount needed (tons)	110	165		74	
Amount available (tons)	95	189		71	
Shortage (tons)	15			3	
Excess (tons)		24			

FEED INVENTORY WORKSHEET (FOR YOUR USE)

I. Cattle inventory

Number of milk cows: ____ Number of calves divided by 4: ____

Number of yearlings divided by 2: ____ Total number of animal units: ____

II. Feed needs

	Lb/day	x Days	Lbs/ Animal unit	Tons/ Animal unit	x Animal unit	= Tons needed
Hay						
Hay silage						
Silage						
Grain						

III. Feed resources

A. Forage

	Bales	x Lb/bale	= Lbs	Tons (lbs÷ 2,000)
Hay (1st crop)				
Hay (2nd crop)				

	Silo size	Depth settled silage	= Tons	Correction factor	Tons
Silage (corn)					
Silage					
Silage					

B. Grain

	Bushels	x Lb/bu.	= Lbs	Tons (lbs÷ 2,000)
Oats		32		
Ear corn		70		
Shelled corn		56		
Barley		48		

Summary	Hay	Silage	Silage	Grain	Grain
Amount needed (tons)					
Amount available (tons)					
Shortage (tons)					
Excess (tons)					

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